

CLAIMS

What Is Claimed Is:

1. A particulate matter analyzer comprises:
a collecting unit for collecting particulate matter in a sample gas;
a mass measuring unit for measuring the mass of the particulate matter; and
a composition analyzing unit for analyzing the composition of the particulate matter wherein the measurement of mass and composition can be done in a sequential manner in one instrument.
2. The particulate matter analyzer of Claim 1, wherein the composition analyzing unit is configured to analyze the composition of the particulate matter by irradiating a measuring spot formed on a filter with radioactive rays such as X-rays or electron beams.
3. The particulate matter analyzer of Claim 1, wherein the collecting unit is configured to enable the sample gas to pass through a filter, thereby forming the measuring spot on the filter, and the filter is made of a material which substantially passes all of the X-rays.
4. The particulate matter analyzer of Claim 3, wherein the filter has an antistatic electricity characteristic.
5. The particulate matter analyzer of Claim 3 wherein the unit for collecting particulate matter includes a filter holding mechanism with a plurality of individual filter holder units, the holder units can progressively and automatically position individual filters at a sample taking station which permits the sample gas to pass through selected filters.
6. The particulate matter analyzer of Claim 1, wherein the mass measuring unit is configured to measure the mass of the particulate matter by using one of an X-ray absorption method, a pressure loss method and a light scattering method.

7. A particulate matter collecting filter comprises:
 - a porous layer made of a fluororesin, and
 - a gas-permeable reinforcing layer which is provided on a surface of the porous layer, wherein the reinforcing layer is made of a porous resin material having a low electrification characteristic.
8. The particulate matter collecting filter of Claim 7, wherein the reinforcing layer is made of a non-woven fabric which consists of any one or a plurality of materials selected from polyethylene, polyethyleneterephthalate, nylon, polyester and polyamide.
9. The particulate matter collecting filter of Claim 7, wherein the filter includes a predetermined reference material other than the target material to be collected to enable a calibration of a particulate matter analyzer processing the collected target material on the filter.
10. A particulate matter collecting filter for collecting particulate matter containing a target material comprising:
 - a porous layer for passing a sample gas; and
 - a reinforcing member for supporting the porous layer, one of the reinforcing member and the porous layer has a predetermined reference material other than the target material to enable a reference comparison when the particulate matter on the collecting filter is subject to an analysis to determine the quantity of the target material.
11. The particulate matter collecting filter of Claim 10, wherein the reinforcing member is a non-woven cloth low in hygroscopicity.
12. The particulate matter collecting filter of Claim 11, wherein the non-woven cloth consists of one of polyethylene, polyethyleneterephthalate, nylon, polyester and polyamide.
13. The particulate matter collecting filter of Claim 10, wherein the porous layer is a glass fiber with a reference material of a predetermined amount contained therein.

14. A system for collecting particulate matter in a fluid and analyzing the mass of the particulate matter and its composition, comprising:

- a collecting unit including a source of filter members for performing a plurality of sequential measurements and a sample fluid supplying unit for directing a predetermined amount of a sample to a filter member to separate particulate matter from the sample fluid;

- a mass measuring unit for measuring the mass of the particulate matter on the filter member;

- a composition analyzing unit for analyzing the composition of the particulate matter;

- a transport unit for moving one of the plurality of filter members from the sample fluid supplying unit to respectively the mass measuring unit and the composition analyzing unit; and

- a controller unit for automatically enabling the collecting unit, mass measuring unit, composition analyzing unit and transporting unit wherein a plurality of measurements with a plurality of filter members can be sequentially performed.

15. The system of Claim 14, wherein the source of filter members includes an elongated roll of filter material and a feeding reel unit which positions a predetermined length of filter material to operatively engage the sample fluid supplying unit.

16. The system of Claim 14, wherein the source of filter members includes a filter holding mechanism which rotates a plurality of individual filter members to operatively engage the sample fluid supplying unit.

17. The system of Claim 14, wherein the filter members have an antistatic characteristic.

18. The system of Claim 14, wherein the filter members include a predetermined reference material other than a target material to be collected to enable a calibration of the composition analyzing unit.

19. The system of Claim 14, wherein the mass measuring unit and the composition analyzing unit are within the same housing and measure the particulate matter at the same location within the housing.

20. A method of collecting and analyzing particulate material from a sample gas comprising the steps of:

providing a predetermined quantity of the sample gas;

passing the sample gas through a filter member to collect particulate material, the filter member includes a predetermined reference material other than a target material to be collected;

positioning the filter member in a composition analyzing unit;

calibrating the composition analyzing unit by comparing a measurement of the target material operatively associated with the filter member to a pre-stored value; and

measuring the composition of the collected particulate material with the calibrated composition analyzing unit.